Alternatively, the topsheet could be used. On the resistive coating **102** is provided an array of spacer dots **104**. These spacers may be screen printed or otherwise formed as indicated previously. As shown, the spacers are formed from a UV curable material, for example a curable acrylic such as the products ML 25265 or PD-038 made by Acheson Colloids of Port Huron, Mich., so that exposure to UV radiation can be used to cure the spacers, adhering them to the resistive layer **102**.

[**0033**] A layer of bonding medium **106** may be applied on top of each spacer **104** as shown in **FIG. 6B**. The bonding medium **106** may be applied by first wetting the surface of a flat plate with the bonding medium and touching the plate to the spacers **104**, thus depositing a bit of bonding medium onto the top of each spacer **104** without depositing bonding medium onto the resistive coating **102**. The bonding medium **106** may also be applied by ink jetting an amount of bonding material onto each of the spacers. The bonding medium **106** may also be applied by depositing bonding material through apertures of a stencil used with a stenciling machine, especially if the same stencil was used to form the spacers. Other suitable methods of supplying the additional bonding medium on the spacers can also be used.

[**0034**] As shown in **FIG. 6**C, and an adhesive sealing material **112** may be applied around the periphery of the touch sensor and topsheet **108** may then be applied on top of spacers **104** and bonding medium **106** with the resistive coating **110** of the topsheet **108** in contact with the bonding medium **106**. As shown, the bonding medium is UV curable so that exposure to UV radiation cures the bonding medium **106** to bond the spacers **104** to topsheet resistive coating **110**. Such a process can be used to double bond the spacers **104** to resistive coating **110** on topsheet **108** as well as to resistive coating **102** on substrate **100**.

[**0035**] The steps as depicted in **FIG. 6** can be varied. For example, curing of either or both the spacers and the optional additional bonding medium can be performed through other means such as heat, chemicals, hardeners, infrared radiation, visible light, electron beam radiation, or similar means. Also, as discussed, the spacers themselves can be formed of a bonding medium so that after being formed on one of the topsheet and the substrate, the other of the topsheet and substrate can be directly bonded thereto, possibly upon appropriate application of radiation, heat, pressure, or the like. For example, the spacers may be an adhesive material ink jetted onto a resistive layer of the substrate or topsheet that is partially cured for initial bonding and then more fully cured after contact with the other resistive layer.

[**0036**] FIGS. **7**A-C show steps that may be performed according to the present invention to make a touch sensor that incorporates double-bonded spacers. **FIG. 7A** shows a layer **720** that can either be the first, movable layer of the touch sensor, or the second layer. Spacers **730** can then be printed or transferred onto layer **720**, resulting in **FIG. 7B**. Spacers **730** include an adhesive material. For example, spacers **730** may be a pressure sensitive adhesive material that is ink jet printed, transferred from a micromold, or otherwise printed or transferred onto layer **720**. A pressure sensitive adhesive can be transferred from a micromold by providing a micromold such as a roll, plate, or film having an array of indentations having sizes on the order of the spacers, coating a pressure sensitive adhesive material into the indentations of the micromold, and pressing the micromold onto layer **720** to thereby transfer the pressure sensitive adhesive material. Preferably, the spacer material adheres sufficiently better to layer **720** than to the micromold to promote transfer of the spacer material. After forming the adhesive spacers **730** on layer **720**, the adhesive spacers can optionally be partially cured to better adhere them to layer **720**. Partial curing preferably leaves the spacers with enough remaining adhesiveness to bond them to layer **710** as shown in **FIG. 7C**. Layer **710** is brought into contact with the adhesive spacers **730**, and bonding can occur by pressure, heat, radiation, and so forth.

[**0037**] Touch sensors of the present invention can be used in any suitable system or application. In exemplary situations, touch sensors of the present invention may be used in display systems such as the display system **800** shown in **FIG. 8**. Display system **800** includes a touch sensor **810** disposed proximate an electronic display **820**. Both the touch sensor **810** and display **820** are coupled to a central processor **840** such as a personal computer. Touch sensor **810** is coupled to processor **840** through controller **830**. Controller **830** helps communicate information from the touch sensor to the processor and vice versa so that user inputs can be properly registered, acted upon, and displayed. Controller **830** is shown schematically as a separate item but may be integrally formed on or supplied directly with the touch sensor **810**, or may be incorporated into the electronics of processor **840**. In display system **800**, display **820** is positioned to be viewed by user **801** through the touch sensor **810**.

[**0038**] The present invention should not be considered limited to the particular examples described above, but rather should be understood to cover all aspects of the invention as fairly set out in the attached claims. Various modifications, equivalent processes, as well as numerous structures to which the present invention may be applicable will be readily apparent to those of skill in the art to which the present invention is directed upon review of the instant specification.

What is claimed is:

**1**. A touch sensor having a touch-sensitive area comprising:

a first layer and a second layer separated by a gap, the first layer movable toward the second layer in response to a touch in the touch-sensitive area to generate a signal for determining the touch location; and

a plurality of double-bonded spacers disposed within the touch-sensitive area and bonded to both the first and second layers.

**2**. The touch sensor of claim 1, further comprising a plurality of single-bonded spacers, each bonded only to the first layer or the second layer.

**3**. The touch sensor of claim 1, wherein further comprising a deformable material substantially filling the gap between the first and second layers.

**4**. The touch sensor of claim 3, wherein the deformable material comprises a liquid.

**5**. The touch sensor of claim 1, wherein the first layer is a topsheet comprising a first resistive layer and the second layer is a substrate comprising a second resistive layer.